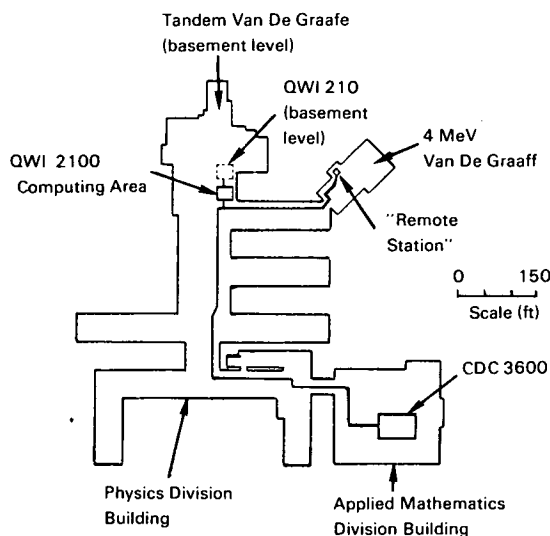


# AEC-NASA TECH BRIEF



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## On-Line Computer System for Use with Low-Energy Nuclear Physics Experiments Is Reported



A generalized ASI-2100 computer program (the DIDJERIDOO program) has been developed to provide physicists using particle accelerators a flexible means of handling data acquired in experiments which utilize the ND-160 pulse-height analyzer and the PHYLIS computing system. The program allows experimenters to choose from about 50 different basic data-handling functions and to prescribe the order in which these functions will be performed. The objective is to give the physicist the greatest degree of freedom and flexibility in setting up his data-handling procedure.

Although the data-handling procedures vary widely with different experiments, each individual procedure can be regarded as a particular sequence of elementary functions drawn from a basic set of such functions (e.g., dump data into computer, print data on

line printer, position magnetic tape, etc.). To cover both two-parameter and one-parameter operation of the analyzer, about 50 functions are needed to form a "complete" set.

The DIDJERIDOO program gives each of these functions a name which is a six-letter mnemonic. The physicist can select a sequence of functions either by typing in a sequence of mnemonics or by reading in a card previously punched with the desired sequence of mnemonics. Once selected, this sequence will be executed by the program each time the B05"B" interrupt button is pushed. Operating procedures are given in the report referenced below.

The chosen sequence of functions can be altered easily anytime during an experiment. This feature ensures flexibility and can also be useful if a piece of peripheral equipment fails.

(continued overleaf)

By pushing the B05"C" interrupt button, any one of the basic set of functions may be selected and executed independently. This is useful when a function is to be performed just once. The "C" interrupt is frequently used to select functions not normally in the "B" interrupt sequence.

The "A" interrupt button is reserved for the mode of operation in which the ADC outputs are transmitted to the computer and buffered out onto magnetic tape.

Since most of the basic functions operate on data such as pulse height spectra, certain specific areas of the ASI-2100 core are reserved for these data. The allocations in the core memory are discussed in the report.

Both for communication between different parts of the DIDJERIDOO program and for ease in off-line data analysis, the format of data recorded on magnetic tape and on cards was standardized. An alpha-numeric card format was adopted.

Every effort was made to have the program specify (via the typewriter) exactly what it wants as input data at each stage. The consequent typewriter "conversations" between experimenter and computer slow down the operation slightly. However, the loss in speed is more than compensated by the gain in clarity and the typewritten sheet then forms a useful log of the experiment.

The figure is a schematic diagram of the various components of the PHYLIS system.

#### Notes:

1. Information on the program has been published by D. S. Gemmell in "WHADDAYADOO With The DIDJERIDOO?" ANL-6993, January 1965. The report is available from the Clearinghouse for Federal Scientific and Technical Information, Springfield, Va. 22151; price: \$3.00 (microfiche \$0.65). Additional information may be found in "An On-Line Computer System in Use with Low-Energy Nuclear Physics Experiments," *Nuclear Instruments and Methods*, Vol. 46, pp. 1-15, 1967.
2. This information may be of interest to persons and organizations concerned with processing large volumes of experimental data.
3. Inquiries concerning this innovation may be directed to:

Office of Industrial Cooperation  
Argonne National Laboratory  
9700 South Cass Avenue  
Argonne, Illinois 60439  
Reference: B69-10094

Source: D. S. Gemmell  
Physics Division  
(ARG-10257)

#### Patent status:

Inquiries about obtaining rights for commercial use of this innovation may be made to:

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